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# Usability Assessment of EPA Environmental Education Web Sites

## EXECUTIVE SUMMARY

### Background and Approach

The Environmental Protection Agency (EPA) conducted usability assessments of the Agency's three environmental education Web sites:

- *Explorers' Club* for children ages 5 to 12 ([www.epa.gov/kids/](http://www.epa.gov/kids/));
- *Student Center* for students in middle school and high school ([www.epa.gov/students/](http://www.epa.gov/students/)); and
- *Environmental Education Center* for teachers and other educators ([www.epa.gov/teachers/](http://www.epa.gov/teachers/)).

All three sites are portals: they provide the structure and framework to enable users to locate age-appropriate EPA, federal and/or federally-sponsored Web sites covering a wide range of environmental topics and activities. A separate usability evaluation was completed for each Web site, representing the combined efforts of the EPA Office of Environmental Information (OEI, which was the lead office), the EPA Access Workgroup (which maintains the sites), and Princeton Energy Resources International (PERI). The reports were finalized in August 2001.

The approach for evaluating the usability of each site involved the following three-step process.

- A *Primary Assessment*, or "expert review," of the site, where an experienced Web site reviewer evaluated the site in terms of broadly accepted usability criteria, including the site's accessibility, form and functionality, and content;
- A *User Test* evaluation, in which "typical" users were observed as they completed a series of task questions and took part in focus group discussions about the site; and
- An *Analysis*, where the results of the primary assessment and user tests were synthesized and assessed, and recommendations for enhancing the site were developed.

The following exhibit summarizes information about the participants who tested each Web site.

<b>Participant Characteristics</b>			
<b>Web Site</b>	<b>User Test Participants</b>		<b>Location</b>
	<b>Grade</b>	<b>No.</b>	
<b>Explorers' Club</b>	3rd Grade Students	7	Thomas Jefferson Elementary School, Falls Church, VA
	4th Grade Students	7	Jamestown Elementary School, Arlington, VA
<b>Student Center</b>	High School Students	5	Woodrow Wilson High School, Washington, DC
	Middle School Students	6	Sandoval Elementary School, Chicago, IL
<b>Environmental Education Center</b>	Middle School Teachers	5	Sandoval Elementary School, Chicago, IL
	High School Teachers	3	Woodrow Wilson High School, Washington, DC

## Results

Expert review and user testing revealed a number of ways to improve and enhance each of the environmental education Web sites. Each site was reviewed according to nine distinct usability criteria and a total of 50 key indicators, or “preferred practices,” of these criteria. The sites were then scored according to whether each key indicator was of “major concern,” “moderate concern,” or “no or limited concern.” The following table compares the three sites based on the number of key indicators that were found to be of major, moderate or no/limited concern, and lists the usability criteria that were most often associated with each set of indicators. The task completion rate, defined as the percentage of tasks that each set of user test participants was able to complete successfully, is also shown.

<b>Web Site</b>	<b>Task Completion Rate</b>	<b>Major Concern*</b>		<b>Moderate Concern*</b>		<b>No/Ltd. Concern*</b>	
		<b>No.</b>	<b>Usability Criteria</b>	<b>No.</b>	<b>Usability Criteria</b>	<b>No.</b>	<b>Usability Criteria</b>
<b>Explorers' Club</b>	83%	12	<ul style="list-style-type: none"> <li>• Site Accessibility</li> <li>• System/Real World Match</li> <li>• Content</li> </ul>	19	<ul style="list-style-type: none"> <li>• Navigability</li> <li>• Recognition</li> <li>• Consistency/Std.</li> <li>• Design</li> <li>• User Control/Help</li> <li>• Accessibility to Disabled Users</li> </ul>	19	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Student Center</b>	48% (Middle School) 63% (High School)	17	<ul style="list-style-type: none"> <li>• Site Accessibility</li> <li>• Navigability</li> <li>• Accessibility to Disabled Users</li> <li>• Content</li> </ul>	18	<ul style="list-style-type: none"> <li>• Recognition</li> <li>• System/Real World Match</li> <li>• Consistency/Std.</li> <li>• User Control/Help</li> </ul>	15	<ul style="list-style-type: none"> <li>• Design</li> </ul>
<b>Environmental Education Center</b>	40% (Middle School) 46% (High School)	13	<ul style="list-style-type: none"> <li>• Site Accessibility</li> <li>• Navigability</li> </ul>	17	<ul style="list-style-type: none"> <li>• Recognition</li> <li>• Consistency/Std.</li> <li>• User Control/Help</li> <li>• Accessibility to Disabled Users</li> <li>• Content</li> </ul>	20	<ul style="list-style-type: none"> <li>• System/Real World Match</li> <li>• Design</li> </ul>

\* Each usability criterion was judged to be of either major, moderate, or no/limited concern based on which category the *majority* of key indicators was assigned to. If there was no clear majority, then the usability criterion was judged to be of major, moderate, or no/limited concern based on how the *most important* key indicators were categorized.

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## Recommendations

Recommendations for improving the usability of each environmental education Web site were developed based on the results and analysis described above. The major recommendations for each site are summarized below. Other recommendations may be found in the individual reports for each site.

### *Explorers' Club*

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<b>Clarify Terminology.</b>	Define terms when they are used in the text and add a simple glossary of terms.
<b>Reassess the Purpose and Target Audience of the Explorers' Club.</b>	The site currently seems most appropriate for kids on the lower end of the suggested age range. Evaluate the linked sites in relationship to the Explorers' Club's intended purpose and target audience to determine if the content is appropriate, too easy, or too difficult for the intended users.
<b>Add Content.</b>	Look for additional sites that provide more: environmental information; creative, challenging and interactive games; new features such as a scavenger hunt or an FAQ section; science experiments; hands-on activities; and information on ways kids can help protect the environment. Consider developing new pages if information is not currently available on existing sites.
<b>Revise the Structure of the Home Page and Second-Tier Pages.</b>	A number of improvements can be made to the site structure that will enhance the site's navigability as well as the visibility and understandability of the objects, actions, and options on the site, including, for example: reorganizing the left side-bar, adding an "Explorers' Club Home" button above the left side-bar, and adding navigational links to the bottom of each page.
<b>Improve Site Navigability.</b>	Improve the site map and create a simple search engine.
<b>Enhance Site Design.</b>	The elementary school-aged users said they would like to see increased use of bright colors, graphics, sound, music, animation, and similar features.

### *Student Center*

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<b>Revise the Structure of the Home page and Subsequent Pages.</b>	Almost half of the issues of "Major Concern" relate to problems of site structure and navigability. Recommendations for improvement include: expand the left side-bar on the home page and subsequent pages; add a "Student Center Home" button to the top of every page; revise and add navigational links to the bottom of each page; enhance the visibility of the left side-bar by increasing the font size and selecting a clearer font; add pop-up mouse-over text for each topic in the left side-bar; and create
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sub-headings at the top of each second-tier page to avoid scrolling down the page to find relevant sites.

**Improve Site Navigability.**

Add a site overview and improve the site index and search engine.

**Assess Accessibility to Disabled Users.**

Add alternative text markers to all images, graphical buttons, image maps, and other non-text features. Review color combinations (especially the dark blue lettering on black) to ensure they are visible to color-blind and visually impaired users. Update or delete the text version of the site. Review the site based on EPA guidelines for accessibility and using an accessibility software program.

**Add Content.**

Provide simplified versions of certain linked sites (e.g., “About EPA,” and “EPA’s Mission,”) and consider rating sites according to whether they are easy, moderate, or difficult to understand. Expand the “Environmental Basics,” “Environmental Club Projects,” “Ecosystems,” and “Careers, Internships & Scholarships” sections. Add more sites containing statistical information, maps, and graphs that students can use in research projects. Review EPA headquarters and regional office Web sites to identify possible sites to add to the Student Center.

***Environmental Education Center***

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**Revise the Structure of the Home Page and Subsequent Pages.**

More than half of the issues of “Major Concern” relate to problems of site structure and navigability. A key to improving the site structure is to provide an alphabetical index of environmental topics so users can more easily find their way to the information they are seeking. Other improvements include, for example: reorganizing the left side-bar, adding an “Environmental Education Center Home” button above the left side-bar, and adding navigational links to the bottom of each page.

**Improve Site Navigability.**

Add a site overview and improve the site map and search engine.

**All Sites**

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**Increase User Accessibility to the Site.**

All three sites are difficult to find using commercial search engines. Accessibility can be improved by: registering with more commercial site engines; listing the sites on kids’ homework sites and/or environmental education Web sites; publicizing the site to educators, schools, and environmental education organizations; ensuring that links to each site are included in other EPA and Federal environmental education sites; and increasing the visibility of the links to each site from the other two

environmental education sites. In addition, the visibility of the links from the EPA home page to the Student Center and Environmental Education Center sites should be improved.

**Perform Additional Usability Testing.**

After each site has been revised, another round of usability testing should be performed to determine the extent to which the changes have improved usability.

**Review Candidate Sites.**

Perform expert review and user testing on several of the currently linked sites, as well as other EPA Web sites that are potential candidates for inclusion in the Explorers' Club, Student Center, and Explorers' Club. The results can be assessed in relationship to the Access Workgroup's Web site evaluation.

**Test Participants' Comments**

The student and teacher test participants expressed both their positive and negative reactions to the three Web sites. Some of the comments they made during the user test sessions are listed below.

<i>Explorers' Club</i>	<i>Student Center</i>	<i>Environmental Education Center</i>
"It is fun to use."	"The topics on the globe were good and made sense."	"It's a major resource for environmental information."
"It is easy to use."		
"I liked the games and stories."	"The mouse-overs were good – the most efficient way to do it."	"I really like the graphics, pictures, etc."
"I'd come back for games and useful information on how I can help the environment."	"Kids don't care about design - just need lots of information."	"It is well set up."
"Music helps bring kids to a site."	"The information is useful, not so much interesting."	"Graphics are clear, good color, not tacky."
"It was hard to find definitions."	"The broad topics are good; specific information is hard to find."	"It was tough to find the path to the answers... the difficulty in understanding is due to the layout."
"Make the home page more colorful."	"Design looks '1996' but it works."	"Put key words in bold lettering and in color."
"I want less words, more pictures!"	"Add more information... want to get as much information as possible, especially graphs, statistics for reports."	"It was very tough to find the site directly from the EPA home page."
"I like to read, and I like the words!"	"More games!"	"Needs less text and heavy explanations."